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INDUSTRIAL USES OF FUEL OIL.
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BY CHARLES P. CUTTEN.

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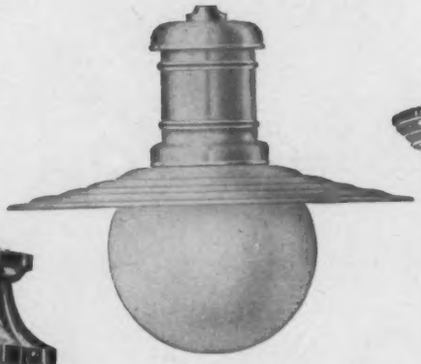

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JOURNAL OF ELECTRICITY
POWER AND GAS
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VOLUME XXXIII SAN FRANCISCO, NOVEMBER 21, 1914 NUMBER 21

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THE DEVELOPMENT OF OREGON'S WATER RESOURCES

BY JOHN H. LEWIS.

(In a most comprehensive manner this paper outlnes what has been done to protect Oregon's water resources and what is needed to develop them. Certain political matters which were settled at the November election have been omitted in adaptng the paper from one read before the Six O'clock Club of Salem. The author has just been re-elected State Engineeer for Oregon.—The Editor.)

In our state land policy, we locked the door after the horse was stolen. With our water resources, it is different. We locked the door before the thief appeared. But, unfortunately, we have kept the door tightly closed and still hold thousands of horses in enforced idleness while we go about our daily tasks in the same plodding way as those of other less fortunate countries. It will be my purpose to state briefly how the public happens to have this great resource still within its control, what steps have been taken to unlock the door for development, and the character of the key necessary to accomplish this purpose.

The Three Sisters, Cascade Mountains, Oregon, Typical Snow-Clad Peaks Affording Ideal Conditions for Irrigation and Power Development.

That this great resource has not been monopolized by the few for the oppression of the many is due to the fact that water has been declared by law to be property of the public and that beneficial use is generally accepted in Oregon as the basis for establishing and maintaining rights to the use of water.

We started out with the old common law doctrine of riparian rights which is to the effect that all streams must flow undiminished and unpolluted to the ocean. Water was thus private property. Streams belonged to the owners of the banks. This is the doctrine desired by the water power interests, the great cattle companies and the land grant corporations, who, for speculative purposes, desire to hold both land and water without use.

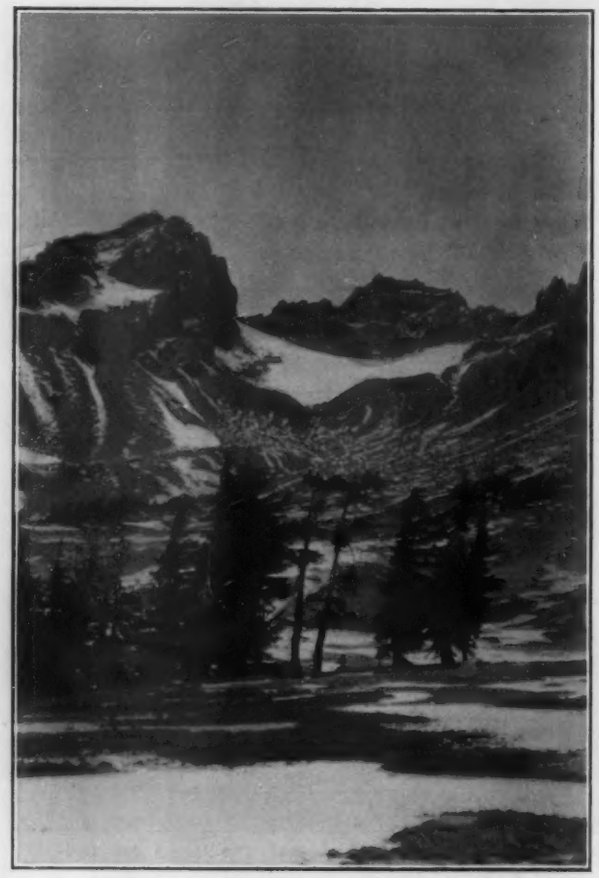
In the arid portions of Oregon, irrigation was found to be necessary for the production of crops and the courts were soon compelled to modify this strict doctrine so as to permit of a reasonable use of water on lands located at some distance from the stream. As these two doctrines are in direct conflict, the courts have held consistently that a litigant can claim either as a riparian owner or an appropriator, but he cannot do both. The courts soon become congested with litigation because of these conflicting theories and the small man was inevitably driven to the wall for lack of funds to defend his rights, while the great corporations divided the water between them.

After a four year campaign of education, Oregon's present water code was adopted by the legislature over

the protest of corporation lawyers and land speculators. It is based upon the theory of public ownership of streams and the right of the public to regulate all diversions under the police power of the state. It affords equal protection to all. This law is generally considered as a model for other states. It has now worked successfully for five years, and has so far withstood the attacks of the corporations before the courts. Recently the Federal Court held this water code to be constitutional, after the third attack by a California cattle corporation having lands in Harney Valley.

Unlocking the Door.

Oregon is generally conceded to have the most consistent and complete laws of any state in the union, looking to the development of her water resources. She is making water surveys so as to know definitely how much water is available. A workable system is provided for ascertaining definitely how much of this is already appropriated for use, so that the amount of surplus water, if any, may be known. It is this surplus water which belongs to the people. Likewise we have provided a system for acquiring rights to unappropriated water. We are also making scientific studies as to the extent of water power and irrigation possibilities and preparing plans and estimates of cost for the construction of a number of large projects. The United States contributes dollar for dollar and co-operates in the carrying on of much of this work. The balance of the cost is offset largely by fees paid for services rendered.



Brokentop Mt., Whose Crater Glacier Supplies Tumalo Irrigation Project.

Neither private or public funds can be invested with safety until we know the location and extent of surplus waters. The people have gone forward step by step following out a logical and conservative program with a view of unlocking the door for development, as soon as this can safely be done.

Owing to the complicated nature of water laws and water measurements, progress has been slow in securing the necessary laws and institutions.

We all know what an acre of land looks like, and how to acquire land titles, but with water and water titles it is different. We know that our valuable school lands were sold at a paltry figure without regard to the value of each tract, and the state school fund was in this manner robbed of millions of dollars by far sighted speculators. If an appropriation had been asked of the legislature to classify and appraise these lands for sale at their true value, these land speculators would doubtless have gone out before the people with a great cry for economy and defeated the measure until such time as their full purpose had been accomplished.

Accurate, reliable and full information accessible to the people is the key that is being used to unlock the door for development.

Difficulties in Irrigation.

Irrigation in the United States is not a poor man's proposition. Suffering and disaster is inevitable where the average man with a family attempts to establish himself on a raw tract of land without a bank account of several thousand dollars, under our present plan of full payment of the development cost within a few short years, coupled with high interest on deferred payments. The privations of pioneer life, and low margin of prospective profit have caused the rich to purchase only developed farms. Our present state and national policies for promoting irrigation have thus failed because the settler cannot make good. Where the settler cannot make a living for his family, he cannot pay for a water right.

Concerning our failure, Elwood Mead, head of the irrigation work in Australia, says: "The financial troubles of American irrigation development have their origin in two mistakes:

First—Construction of works outran the demand for irrigation by those able to pay.

Second—Failure to extend aid to men of small capital in overcoming initial obstacles."

Leading authorities in this country have recognized these difficulties, but the old cry of paternalism is raised when a practical remedy is suggested. We overlook the fact that the purchasing power of a dollar has greatly diminished since pioneer settlement days. Practically no progress has been made in clearing the logged-off lands of the Willamette Valley since this early era of cheap labor. We must have cheap labor or cheap money to make progress in developing Oregon. A return to cheap labor conditions is undesirable, but cheap capital can be made available if we have any confidence whatever in governmental machinery. We have made some notable advances in this direction with the successful construction of the Panama Canal, and the many projects of the U. S. Reclamation Service, without any suggestion whatever of graft. I believe it is safe

to go forward another step at this time and, especially in view of the great change which is taking place in world commerce.

Australia Solves Problem.

We are indebted to Australia for a successful large scale demonstration of state aid to settlers on irrigated lands. The same principle could doubtless be applied for the settlement of our logged-off lands. Under this system a poor man with energy and ability can go upon the land and make good from the start.

The first step in the Australian plan is to purchase the land at dry farm prices. After irrigation, this is sold at actual cost of land and water upon the following terms: Three per cent of the cost to be paid in cash, balance in 31½ years with interest at 4½ per cent. The small payment of 6 per cent annually will in such time pay both principal and interest. So satisfied is the government with the possibilities of this system of settlement, that it is now taking measures to further liberalize the terms by reducing the interest to 4 per cent and extending the payment to forty-one years. The state also builds houses for settlers, grades a part of their land, if desired, loans tools at the outset for a nominal fee, and charges the same to the land, giving a long time for repayment with low interest.

In addition to this, the state makes liberal loans to settlers, payable in 20 years at 5 per cent interest. These loans are based upon 60 per cent of the value of improvements which are made.

"Under these conditions, no man who will work need fail; and every man who longs for a home can secure it" according to Elwood Mead.

The Canadian Pacific Railway has adopted this plan of financing settlers, in the disposal of its vast holdings. So has New Zealand, and newspaper reports indicate that British Columbia is now considering the plan. After a few more of our best citizens have left for foreign countries, we may wake up to the fact that there is such a thing as competition in securing development.

If such a system could be adopted by Oregon, acting in co-operation with the United States, and utilizing its superior credit, the small payment of only four per cent annually could be made to pay both principal and interest on the original cost of development, provided payments are extended over a period of 50 years. Money at three per cent interest is used in this calculation. Development possibilities under such liberal plan of payment could be greatly stimulated, without at this time financing settlers if such plan seems objectionable.

Subduing the logged-off lands of western Oregon is perhaps a more formidable problem than irrigation in eastern Oregon, as the original acre cost in most cases will be higher. Large scale clearing operation with powerful machinery and perhaps some financial aid in the shape of low interest may be necessary before this problem is solved. Cities have learned to use their public credit for the benefit of its citizens. Why should not the state do likewise?

When men on developed farms with ample credit find it necessary to have some system of rural credits to supply cheap money for carrying on profitable farming, is it not high time that we devise some plan so as to afford cheap money for the man on the undeveloped farm where the initial outlay is much greater, and where title to the land is not secured until the development cost is fully paid? For lack of title these men, of whom Oregon is so much in need, cannot come within the rural credit scheme. Are we to deny them equal opportunities? Our vast public credit, like our land and water resources is lying dormant and unused.

Water Power Development.

The development of our vast water power resources, presents about the same difficulties as encountered in the development of our logged-off and arid lands. More water power is now developed than can be disposed of under present high rates. But with a radical reduction in rates, the market for electrical power seems almost unlimited. Cheap power can be used in the electric furnaces for the smelting of ores, in competition with coal heat,and the many new electro-chemical industries open up a vast field for development. The indirect benefits to be derived from this development, such as the canalization of our streams, the opening up of new industries, construction of electric railways, and the comforts to be derived through the increased use of electric power in the home and on the farm should justify the placing of water power development upon the same basis as we are now conducting irrigation development.

Notwithstanding the fact that we have in the Columbia River basin approximately one-third of all the undeveloped water power in the United States, and this, the property of the people, yet we are deriving no special benefit from this resource. Private capital has not, and apparently will not, make this power available for use at such rates as will permit those new industries demanding cheap power to live. Is it not time that we seriously consider some new plan which may result in putting this wasting power to use?

Perhaps the most extensive field for the utilization of this cheap water power is in the making of fertilizers. I am informed by experts, who are supposed to know, that Portland can capture the fertilizer trade of the world if she acts promptly. This trade amounts to $500,000,000 annually. That for the United States alone is about $150,000,000 annually, fifty per cent of which is with the cotton producing states of the south.

Three classes of material are necessary for the production of a balanced fertilizer, suitable for most ordinary purposes, namely: Phosphates, nitrates, and potash.

"The basis of all artificial fertilizers is superphosphate."

It has recently been discovered that this can be produced by heating phosphate rocks in the electric furnace. Large quantities of high grade phosphate rock are found in Idaho, Montana and Wyoming. These deposits are said to surpass those of Florida and the southern states. Ammonia and lime will be had as a by-product in making fertilizer in the electric furnace.

The world supply of nitrogen has heretofore come substantially from the natural deposits in Chile. We

have in Oregon enough nitrogen in the air over one square mile of the earth's surface to supply the world for 50 years, according to authority. This can be extracted in the electric furnace, if cheap power is available.

The world's supply of potash is extracted almost exclusively from the potassium salts coming from the mines of Strassfurt, Germany. In the kelp beds along the Oregon and Washington coast, we have a cheap and abundant supply of potash. This kelp can be harvested annually without injury to the plants, thus insuring a perpetual supply. Several simple methods of recovering this potash are known, one of which is an electrolytic process. These beds lie along the coast

Feed Canal for 23,000 Acre Tumalo Project, Built by State of Oregon at Cost of $450,000.

within the three-mile limit and are apparently property of the state. Private capital has not been able to acquire title and exploit this resource, and the public has taken no steps to devise ways and means of harvesting and marketing this crop, which for years has been going to waste, while the American farmer is paying millions of dollars to the potash trust of Germany.

Cheap electrical power is the key to the development of this vast industry which will give profitable employment to thousands of men, and open the field to the establishment of innumerable by-product industries, the canalization of our streams, and the development of a world commerce, which would be of inestimable value in marketing our lumber, fruit, fish, dairy, and other products. All of the resources necessary to capture this enormous trade are located within or adjacent to the Columbia River basin.

If private capital could get possession of these resources, development would doubtless be under way, and prosperity abroad in the land. Or if the public could act promptly and intelligently, this prosperity would perhaps be greater and more equitably distributed.

Competition from the cheap water powers of Norway need not be feared as both the raw materials and markets are too far removed. Another attractive locality where enormous blocks of cheap water power can be had on tide water, is the Saguenay River in Ontario, Canada. Here American capitalists have purchased extensive water power privileges and contemplate the construction of a 300,000 h.p. plant for the production of phosphoric acid fertilizer, using phosphate rock from Florida. (U. S. Daily Consular Reports, March 27, 1914.) Navigation to this plant is closed by ice five months in the year, and we need fear no competition from this source, unless we delay until the trade is firmly established in this foreign field, through the establishment of innumerable by-product plants.

The state and the United States are now co-operating in the investigation of a large water power project on the Columbia River near The Dalles with a view to outlining some plant for its construction. This is one of the largest water powers near tide water on the Pacific Coast, and investigations so far indicate no construction difficulties, which appear to be insurmountable. It is believed the final estimates of cost will be such that power can be sold in successful competition with any other project, so far known, and especially if public funds bearing low interest can be used in financing. It is the convenient rail and water transportation, mild winter weather, and the presence of necessary raw materials in the neighborhood, of this power, which make the project of such great commercial importance to the district.

Plan of Development.

How can this great development be brought about? It must be through the application of business principles along practical and conservative lines, whether undertaken by public or private capital.

The electrification of the railroads in the Willamette Valley was not commenced until every scheme and piece of apparatus was tried out on an experimental road in Southern California. The people cannot decide between public or private development without more definite and accurate information. Private capital will not exploit the field without tieing up great bodies of natural resources, and then only when the prospective profits will be very large.

What is apparently needed for a solution of this problem is a demonstration power plant operating on a commercial scale, so that every phase of these varied enterprises can be tested out, perhaps in co-operation with private capital and the United States, and the information made accessible to the public. Such an experimental plant can and should be operated without cost to the taxpayer. This is the method which was adopted in Norway for encouraging the electric smelting of ores, utilizing the cheap water power of that country. It should work in Oregon. If private capital can be induced to enter the field, on reasonable terms, then further progress toward public construction should be suspended. In the construction of these large projects with public funds, there should be no thought of competition with private capital already invested in the field, but rather to do those things which such companies cannot do. The retailing of power to small consumers is an exceedingly complicated business compared with wholesale production. We will thus be dependent upon private capital for the real work of development, and any tendency of unfairness on the part of the public is liable to do injury.

ELECTRIC DISTRIBUTION

STANDARDS AT SAN DIEGO.

I—Miscellaneous.

BY L. M. KLAUBER.

[Continued.]

This section of the handbook contains several subjects which could not be classified otherwise, as follows:

I 10. Resuscitation Rules.

I 20. Company Telephones.

I 40. Phasing Out.

Three sheets of the handbook are occcupied by the N. E. L. A. Rules for resuscitation in cases of electrocution, asphyxiation, drowning, etc., which are here omitted because of their general accessibility. The list of company telephones is also omitted as being a matter of only local interest.

I 40. Phasing Out. These notes on phasing out are of assistance to line and wire men. Definite information on each specific case often saves time and trouble.

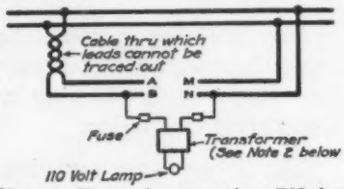
I 40.1. Connecting a Dead Three-Phase Line to a Live One.

Where a new three-phase line is connected to an old line no phase rotation precaution need be taken.

Where an old three-phase line, temporarily dead, is to be re-energized in such a way that it cannot be predetermined whether the phase rotation will be the same as it was under previous conditions, a man should be stationed at some small three-phase motor on the dead line where the previous direction of rotation is known. Close the motor switch. Then close the line switch momentarily, and communicate with the man at the motor. If the direction of rotation be correct the line may be permanently closed; if incorrect, reverse one phase. Large motors on the line will be protected by their low voltage releases.

I 40.2. Connecting Two Branches of Same Single - Phase Line When Leads Cannot Be Traced Out.

Connect a transformer between two leads as shown. If the lamp is dark the gap may be closed. If the lamp glows try AN.



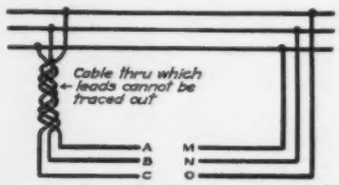
Note 1. Even if connecting BN shows a dark lamp it is safer to try AM also, before bridging both gaps, as there might be a break in B or N, and the dark lamp would not prove that they were from the same lead. It is also well to connect the transformer across AB first to see that the transformer, lamp and fuses are in operating order.

Note 2. For 11,000 or 2200 volt lines use 11,000 to 110 or 2200 to 110 volt transformers of the smallest size that can be conveniently obtained. For d.c. or low voltage a.c. circuits use banks of lamps consisting of 5-110 volt lamps in series for 550 volt circuits, 4-110 volt lamps in series for 440 volt circuits, etc. The lamps used must all be of the same wattage. In any case a voltmeter of the proper voltage may be used in the place of lamps.

Note 3. If one line has an excessive load and the other is lightly loaded, the lamp will glow lightly in all cases. In such a case remove the load while phasing out.

I 40.3. Connecting Two Branches of the Same Three-Phase Line When Leads Cannot Be Traced Out.

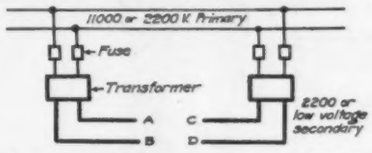
Follow procedure on Sheet I 40.2, trying A with M, N and O successively until corresponding lead is found.



Then try B with the two remaining; then C with the last one.

I 40.4. Connecting Two Singe-Phase Lines From Separate Transformers.

In this case tests across AC and BD must be made simultaneously. Otherwise the procedure is the same as on Sheet I 40.2, connection being made



when both lamps are dark. When the two lines to be connected are 2200 volts the small testing transformers should be of the same ratio and capacity. Where the lines to be connected are secondary the lamps used should be the same size. It is understood that the transformers to be paralleled must be of the same ratio for successful operation.

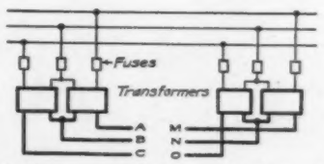
Note. It is possible, but not advisable (except in the case of secondaries) to connect A to C and then test across BD. If the test is made in this way the voltmeter or lamps must have a range of **twice** the voltage of the circuit. This method has the advantage that only one voltmeter is required. If two leads are grounded at the transformers (as for instance A and C) this is equivalent to connecting A to C and the test should be across BD, using double range voltmeter or lamps. If this shows double voltage the ground on C should be transferred to D. In the case of 3-wire secondaries with grounded neutral test between outside leads with double voltage instrument.

I 40.5. Connecting Two Three-Phase Lines From Separate Telephone Banks.

Take any pair of wires on one side and test with various pairs on the other side by the procedure shown on I 40.4 until proper lines are found. In order to miss no combinations try in the following order:

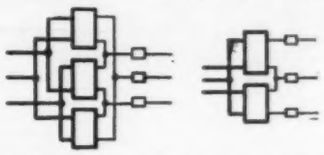
A to M and B to N
A to N and B to M
A to M and B to O
A to N and B to O
A to O and B to M
A to O and B to N

When the proper pairs have been determined, line C should test O.K.



with the remaining line of the other group. The same precautions should be taken as given in the note on I 40.4.

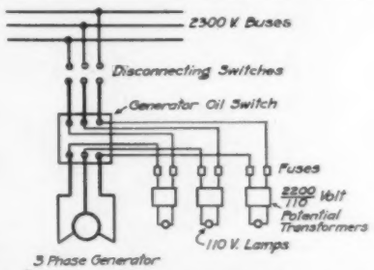
Occasionally cases may be found wherein the transformers of one bank have polarities other than standard. In this case, after the first two pairs of wires have been correctly phased, the third wire will not phase with that



remaining, but will show about 170 per cent normal voltage across the gap. If such a case be found, connect one bank of transformers as shown in the small drawing; or if a closed delta bank, as shown in larger drawing.

I 40.6. Phasing Out Three-Phase Generators.

In phasing out a new generator run it at approximately synchronous speed and bus voltage. With connections as shown above the lamps should all glow and become dark together. If they do not, reverse any pair of generator leads at the generator switch.



The lamps should then glow in unison and the new generator may now be synchronized in the usual manner. It is always advisable to run an extension cord from one of the sockets on the synchroscope, or if lamps are used for paralleling, from one of the synchronizing lamp sockets to a position near the test lamps, so as to be sure that these lamps also glow and darken in unison with the test lamps.

[To be continued.]

INDUSTRIAL USES OF FUEL OIL.

BY F. B. DUNN.

(Continued.)

Pumping Systems.

Many classes of pumping systems have been devised to handle the oil from the storage tank to the burners. As a rule they consist of two pumps mounted upon a bracket or base containing the oil heater which utilizes the exhaust steam from the pumps or live steam from the boilers, thus bringing the oil up to the required temperature. The pumps are set on a flat cast iron pan so arranged that they may be overhauled without allowing the oil or water to flow over the heater or fireroom, and deep enough to hold the oil contained in the pump cylinders. An oil relief valve is placed on the discharge line and fitted so as to allow any excess oil to return to the tank.

Oil strainers are either fitted in duplicate or the self cleaning type is used. An air tank is placed on the discharge line to take up the pulsation of the pump, thus insuring a steady pressure. The pressure is also regulated by means of a pump governor fitted on the steam line to the pumps and connected to the oil line.

By an arrangement of valves and fittings either pump may be used, the oil passing either through the heaters or directly to the burners. Any gas formed in the oil chambers may be vented through proper valves and gages and provided to show the pressure and temperature.

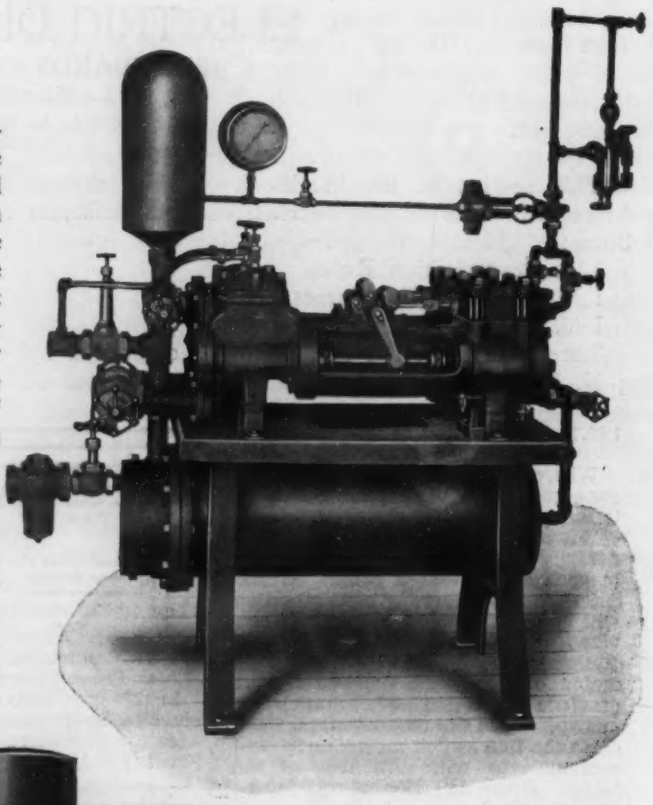


Fig. 9. Witt Oil Pumping System.

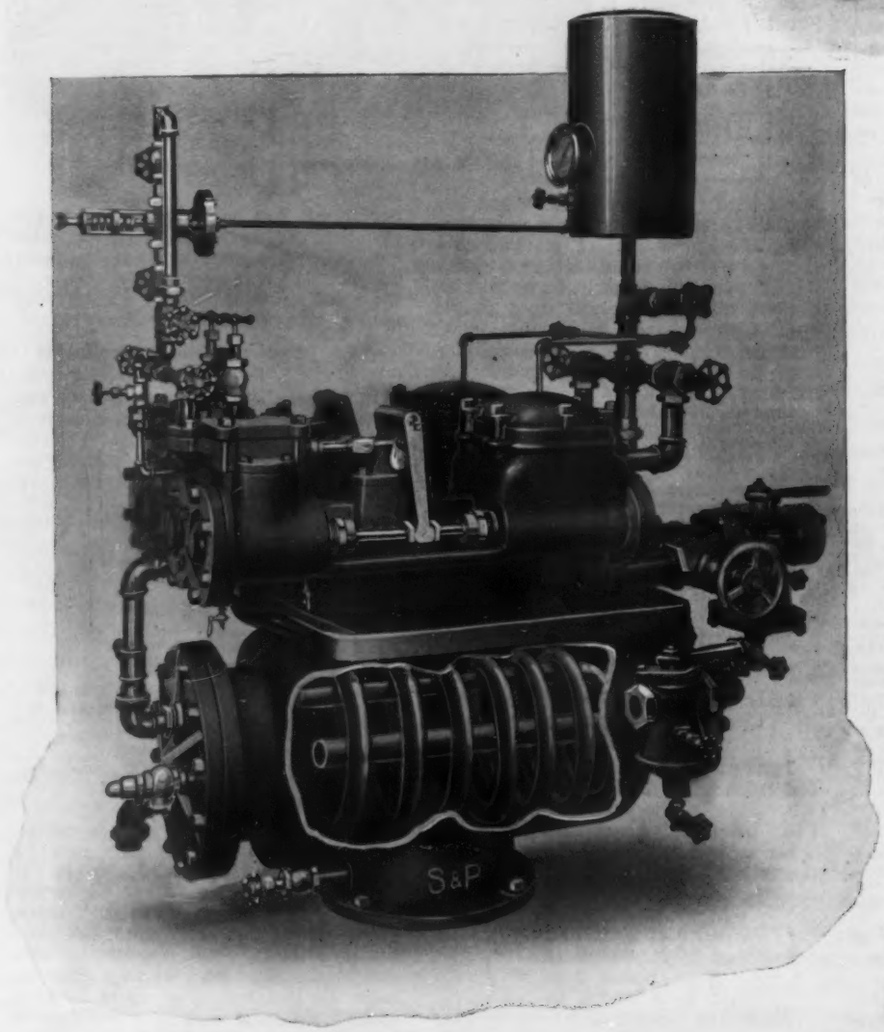


Fig. 8. S. & P. Fuel Oil Pumping System.

Fig. 8 shows a complete and very compact fuel oil pumping system. Fig. 9 showing a less expensive installation.

Fig. 10 shows a pumping system and heater arrangement for a "mechanical" oil burner installation. Owing to the high pressures and temperatures used with mechanical systems, care must be taken to have all fittings of the best quality. Fig. 11 shows a low pressure heating system, used in kitchen ranges, hot water boilers, low pressure steam boilers, and hot air furnaces.

(To be continued.)

Electric propulsion of the collier Jupiter has proven so successful that Secretary Daniels has authorized the same plan for the new super-dreadnaught California, which will be built at the New York navy yard.

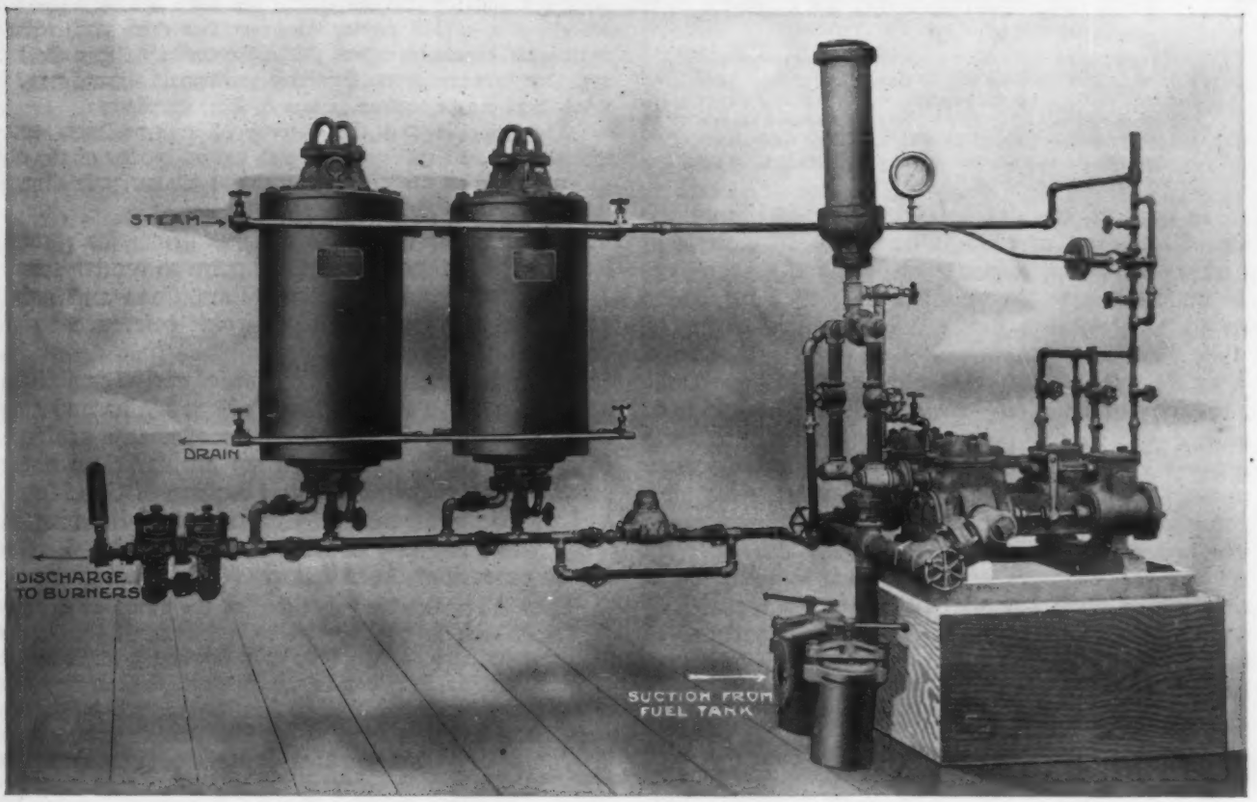
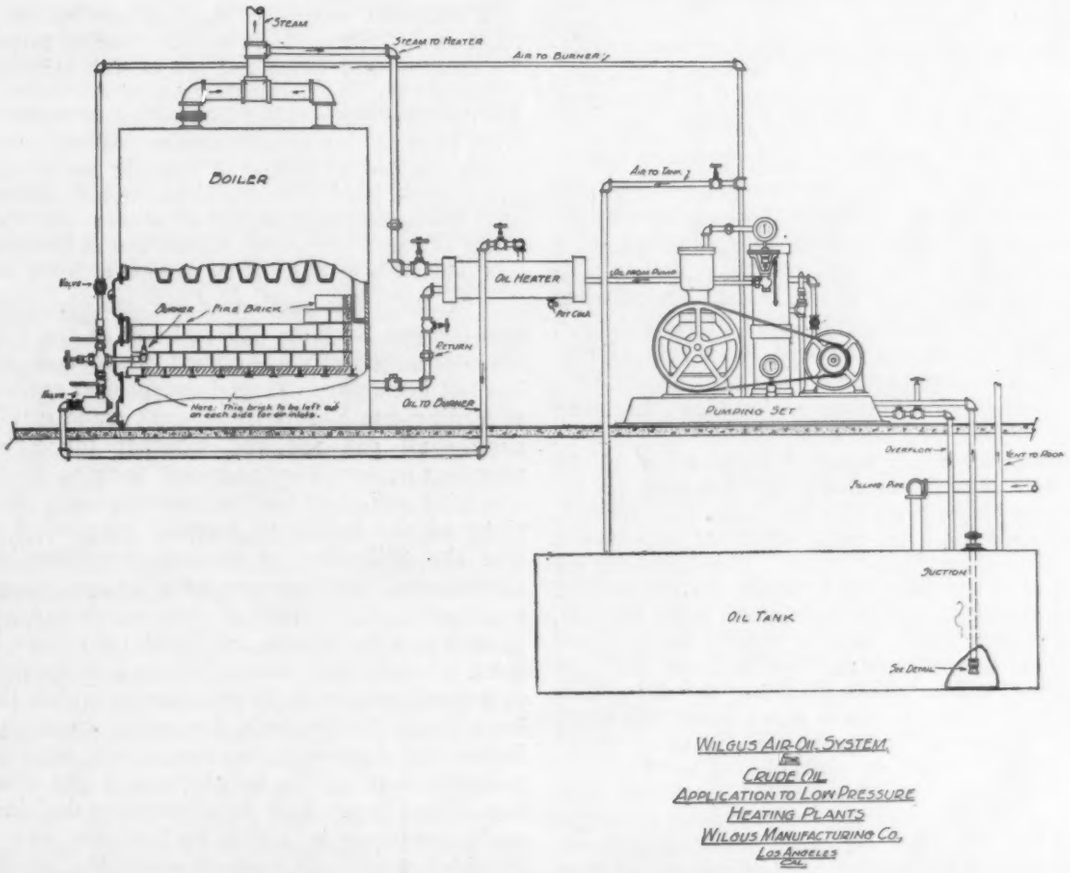


Fig. 10. Union Iron Works Oil Pumping System.



Wilgus Air-Oil System.
Crude Oil
Application to Low Pressure
Heating Plants
Wilgus Manufacturing Co.,
Los Angeles
Cal.

Fig. 11. Wilgus Low Pressure Oil Pumping System.

THE OBLIGATION TO SERVE.

BY CHARLES P. CUTTEN.

(In this article the author contends that no unreasonable service extensions can be compelled, giving legal opinions to back up his contention. While this paper appertains particularly to gas, being condensed from a paper presented before the Pacific Coast Gas Association, the arguments are equally applicable to other forms of utilities.—The Editor.)

In general, the nature and extent of the obligation of a utility, whether it be a gas, an electric or a water company, depends on what that company has undertaken to do or what its public profession has been. Professor Bruce Wyman, in his work on Public Service Corporations, states the rule, as follows: "Public profession not only establishes public obligation but it largely determines the extent of the public duty. Just as people cannot be forced to serve unless they have made public profession, so they cannot be forced to serve beyond what their profession covers." For instance, a gas company going into business in an incorporated city does not by that act undertake to serve the people on the outskirts of the town but not within its boundaries. It may even limit its profession to serve to portions of the town. A company furnishes gas in one town, electricity in another, and water in a third, cannot be compelled to serve the first town with water or electricity, the second town with gas or water, or the third town with gas or electricity unless it has professed the particular service by some contract, franchise obligation or act of its own. In other words, the obligation to serve only extends to the sort of service in the particular territory which the utility has undertaken to supply.

But, having settled the primary question and determined just what territory the company has professed to serve and just what service it is furnishing, is the obligation to serve all in this territory with the commodity a fixed, determined and arbitrary obligation? My answer is no. Unless the demand for service is reasonable no extension can be compelled by any legislative or administrative body whether it be a commission or a municipal council. Justice Pitney of the Supreme Court of the United States when Vice-Chancellor of the Equity Court of New Jersey, illustrates the limitations imposed by a rule of reason on this obligation to serve. He says, in the case of Public Service Corporation v. American Lighting Co., 57 Atl, 485-86, as follows:

> Must not the demand for measured gas be reasonable? To illustrate: Suppose a person should rent for three summer months a vacant lot in Jersey City and facing on a street in which complainants had a gas main, and should place thereon a tent, or erect a rough board shanty. Would anybody say that such demand was reasonable? Would the obligation of complainants, arising out of their exercise of a public franchise, extend so far as to compel them to excavate the earth and lay down a gas supply pipe to that tent or shanty, and place therein a meter, without proper protection, for the purpose of supplying gas for three months to such a tenant, who might, after all, not use any gas? Suppose, again, a person should rent from month to month one room on the top floor of a many storied building, which the owner had not thought fit to have furnished with gas pipes, and should demand of the gas company that it put in a pipe and "riser" through premises not belonging to it, to supply a single gaslight to a tenant from month to month. Would such a demand be reasonable? In short, is not the obligation to supply a dwelling or tenement with gas, and for that purpose to lay down a supply pipe and set a meter, subject to the limitation that there shall exist a reasonable expectation that the consumption of gas shall be sufficient to warrant the necessary preliminary expenditure? I think there can be but one answer to these questions.
>
> The principle that the element of reasonableness enters into the practical application in each particular case of the obligation resting on the gas companies was not seriously disputed by counsel of the defendants.

Having set forth the general principles governing the obligation of a gas company to render service I shall consider the different limitations and subdivisions of my topic with particular reference to the laws of California.

The legislature of California early established a policy relative to extensions of gas mains and services in territory in which a gas company professed to give service. In 1863 an act entitled "An act to provide for the Inspection and Sealing of Gas Meters, and for the Protection of Consumers of Illuminating Gas," was passed by the legislature. Section 5, relating to extensions, is as follows:

> Upon the application, in writing, of the owner or occupant of any building or premises within one hundred feet of any main laid down by any gas light company, and payment by him of all money due from him to the company, the company shall supply gas as may be required for lighting such building or premises, notwithstanding there may be rent or compensation in arrears for gas supplied, or for meter, pipes, or fittings furnished to a former occupant thereof, unless such owner or occupant shall have undertaken or agreed with the former occupant to pay or to exonerate him from the payment of such arrears, and shall refuse or neglect to pay the same; and if, for the space of ten days after such application, and the deposit of a reasonable sum, as in this Act, provided, (if required), the company shall refuse or neglect to supply gas as required, the company shall forfeit and pay to such applicant the sum of fifty dollars, and the further sum of five dollars for every day thereafter during which such refusal or neglect shall continue, provided, that no such company shall be required to lay service pipe for the purpose of supplying gas to any applicant where serious obstacles exist to laying the same, unless the applicant, if required, shall deposit in advance with the company a sum of money sufficient to pay the cost of his portion of the pipe required to be laid, and the expense of laying such porton.

In 1872 this section of the statute was codified and became Sections 629 and 630 of the Civil Code. The obligation of a gas company under these sections has not been since changed except that extensions not exceeding one hundred feet were made mandatory to supply all gas required whether for lighting the premises or for other purposes such as heat or fuel.

This action of the legislature clearly defined the right of the public to demand extensions and limited the obligation of the gas company in respect thereto, and has been accepted by the companies as reasonable. The right of the legislature under the constitution to impose an additional obligation upon them whereby they were compelled under this section to expend money in improvements which they must have found burdensome, has never been questioned. Before its enactment the law clearly established the principle that it was the duty of a gas company to supply gas impartially to all persons desiring its use within territory in which its business was confined, provided that such persons made the necessary arrangements to receive the gas and comply with the reasonable regulations of the company. From the

earliest days of the gas business suits have been maintained to compel, by the writ of mandamus, a gas company to serve with gas persons along its lines. When this law was passed no case existed to my knowledge which laid down a rule that a company might be compelled to extend its service into new territory except where the express terms of its franchise had obligated it to do so or except where it had for a consideration otherwise agreed to make extensions or betterments.

In December, 1911, the legislature passed what is termed the "Public Utilities Act" which became effective March 23, 1912. By its terms there is conferred on the railroad commission broad powers to compel gas companies, as well as other public utilities, to make extensions and improve facilities. Section 36, which deals with this subject, is as follows:

Whenever the commission, after a hearing had upon its own motion or upon complaint, shall find that additions, repairs or improvements to, or changes in, the existing plant, equipment, apparatus, facilities or other physical property of any public utility or of any two or more public utilities ought reasonably to be made, or that a new structure or structures should be erected, to promote the security or convenience of its employes of the public, or in any other way to secure adequate service or facilities, the commission shall make and serve an order directing that such additions, extensions, repairs, improvements or changes be made or such structure or structures be erected in the manner and within the time specified in said order. If the commission orders the erection of a new structure, it may also fix the site thereof. If any additions, extensions, repairs, improvements or changes, or any new structure or structures which the commission has ordered to be erected, require joint action by two or more public utilities, the commission shall notify the said public utilities that such additions, extensions, repairs, improvements or changes or new structure or structures have been ordered and that the same shall be made at their joint cost, whereupon the said public utilities shall have such reasonable time as the commission may grant within which to agree upon the portion or division of cost of such additions, extensions, repairs, improvements or changes or new structures, which each shall bear. If at the expiration of such time such public utilities shall fail to file with the commission a statement that an agreement has been made for a division or apportionment of the cost or expense of such additions, extensions, repairs, improvements or changes, or new structure or structures, the commission shall have authority, after further hearing, to make an order fixing the proportion of such cost or expense to be borne by each public utility and the manner in which the same shall be paid or secured.

[Here follows a discussion regarding the lack of commission control in municipalities, which has since been settled by the passage of Amendment 28 at the November elections. This gives the commission exclusive power to fix public utility rates in all incorporated municipalities; such municipalities, by vote of electors thereof, may retain that control over public utilities which relate to local, police, sanitary, and other regulations only, or may surrender same to the railroad commission.]

It is my opinion that no power can be vested in any legislature or administrative body to compel service in any territory which the utility does not profess to serve or has never held itself out as willing to serve, or into which it has no legal right to enter.

It has been repeatedly held in California that one owning a water supply is not compelled to dedicate it all to the public use, or that he may dedicate a part of it only, to such use, reserving the remainder for private purposes or for private sale, or disposition as he sees fit. It was said in the decision of the case of Del Mar Water, Light & Power Company v. Eshleman, 47 Cal. Dec. 571, 582, "our decisions have recognized and have repeatedly declared the right of a water company to make such limited dedication and to decline to furnish its water to persons not within the area it has undertaken to serve." The same principle is announced in Leavitt v. Lassen Irrigation Co., 157 Cal. 92; Thayer v. Cal. Dev. Co., 164 Cal. 128; Hildreth v. Montecito Creek Water Co., 139 Cal. 29. A gas company need not expand beyond the limits of the territory which it has chosen to serve.

As to making extensions beyond franchise limits, it will not require authorities to prove that no gas company can be compelled to do an unlawful act. It could not be punished for refusing to tear up streets and lay down pipes where it had no legal authority to operate. Neither can it be compelled to go upon private property with its pipes and mains to supply gas. It does its full duty if it brings the gas to the property line within territory which it has professed to serve with gas and in which it has a legal right to do business.

Despite some loose language in some of the decisions that a company is under an implied obligation to extend its service to all persons living within the limits of the municipality which it is organized and chartered to serve, I maintain that the element of reasonableness enters into the problem in each particular case and the extent of the obligation resting on the gas company to make extensions is measured in each case by the test of reasonableness unless there is an express contract to extend on the part of the company.

In commenting on the case of Public Service Corporation v. American Lighting Co., 67 N. J. Eq. 122, 57 Atl. 482 (1904), where Vice Chancellor Pitney, now Justice of the Supreme Court of the United States, said: "In short, is not the obligation to supply a dwelling or tenament with gas, and for that purpose to lay down a supply pipe and set a meter subject to the limitation, that there shall exist a reasonable expectation that the consumption of gas shall be sufficient to warrant the necessary preliminary expenditure?" Mr. Bruce Wyman, in his recent work on Public Service Corporations, states on page 252, as follows:

As this is a relative test it will be seen why comparatively little has to be assured when it is the question of going a few feet off the established mains; the usual consumption of the average customer would secure that. But installation for a single person at some distance from the established mains would not be obligatory in ordinary conditions. Following out the general principle still further, the building of a few houses would call for the extension of a main a little further along a street. But a great deal of business must be shown in order to establish certainly the present obligation to construct new lines into outlying territory. The undertaking to serve a community does not, therefore, lay the company open to outrageous demands in individual cases, but to such service as the community considered as a whole may demand.

The case of Russel v. Sebastian, decided April 6, 1914, by the Supreme Court of the United States, has been cited to sustain the proposition that utilities

supplying electricity, gas or water in California have assumed a greater obligation in the matter of making extensions in cities than I have stated to exist. I think when this case is properly understood, and the language read in connection with other decisions of the Supreme Court, that it will be found that the existing rules of law have not been changed in any respect by the decision in the above case.

Prior to October 10, 1911, every utility that desired to supply a city and its inhabitants with light or water could do so without charge or restriction except the giving of indemnity for damage to the streets. On this date there went into effect an amendment to the state constitution whereby cities were given authority to provide in their organic laws conditions and regulations under which light, water, power and heat could be furnished to municipalities.

The Supreme Court of the United States in Russell v. Sebastian, above, held that this amendment to the constitution of California, made in 1911, did not affect the right which companies had gained by building works and starting to supply the cities of California with light, heat or power to continue their extensions of service and cover the entire city which they had undertaken to serve. The court held that the constitutional amendment of 1911, and the municipal ordinances adopted under it, were ineffectual to impair this right, and that the company was entitled to extend its mains for the purpose of distributing its supply of gas to the inhabitants of the City of Los Angeles subject to the conditions set forth in the constitutional provision as it stood before the amendment. Justice Hughes, in writing the decision of the court, uses the following language:

> This construction of the constitutional provision is the only one that is compatible with the existence of the duty which it was intended, as it seems to us, that the recipient of the state's grant should assume. The service, as has been said, was community service. Incident to the undertaking in response to the state's offer was the obligation to provide facilities that were reasonably adequate. Lumbard v. Stears, 4 Cush. 60; Cumberland Teleph. & Telegh. Co. v. Kelly, 87 C. C. A. 268, 160 Fed. 316, 324, 15 Aun. Cas. 1210; Atlantic Coast Line R. Co. v. North Carolina Corp. Commission, 206 U. S. 1, 27, 51 L. Ed. 933, 945, 27 Sup. Ct. Rep. 585, 11 Ann. Cas. 398; People ex rel. Woodhaven Gaslight Co. v. Deehan, 153 N. Y. 528, 533, 47 N. E. 787; Morawetz Priv. Corp. Sec. 1129. It would not be said that either a water company or a gas company, establishing its service under the constitutional grant, could stop its mains at its pleasure and withhold its supply by refusing to extend its distributing conduits so as to meet the reasonable requirements of the community. But this duty and the right to serve, embracing the right under the granted privilege to install the means of service, were correlative.

It will be noted that the court in one place states that the obligation was "to provide facilities that were reasonably adequate," and in another place as follows: "It would not be said that either a water company or a gas company, establishing its service under the constitutional grant, could stop its mains at its pleasure and withhold its supply by refusing to extend its distributing conduits so as to meet the reasonable requirements of the community.

The reasoning of the decision of the Supreme Court of the United States in the case of State of Washington, ex rel. O. R. N. & N. Co. v. Fairchild, 224 U. S. 510, upholds the view expressed in this paper. The court, on page 529, states as follows:

> Since the decision in Wisconsin &c. R. R. v. Jacobson, 179 U. S. 287, there can be no doubt of the power of a state, acting through an administrative body, to require railroad companies to make track connection. But manifestly that does not mean that a commission may compel them to build branch lines, so as to connect roads laying at a distance from each other; nor does it mean that they may be required to make connections at every point where their tracks came close together in city, town and country, regardless of the amount of business to be done, or the number of persons who may utilize the connection if built. The question in each case must be determined in the light of all the facts, and with a just regard to the advantage to be derived by the public and the expense to be incurred by the carrier. For while the question of expense must always be considered (Chicago & C. R. R. v. Tompkins, 176 U. S. 167, 174), the weight to be given that fact depends somewhat on the character of the facilities sought. If the order involves the use of property needed in the discharge of those duties which the carrier is bound to perform, then, upon proof of the necessity, the order will be granted, even though "the furnishing of such necessary facilities may occasion an incidental pecuniary loss." But even then the matter of expense is "an important criteria to be taken into view in determining the reasonableness of the orders." Atlantic Coast Line R. R. v. North Carolina Commission, 206 U. S., 1, 27; Missouri Pacific Ry. v. Kansas, 216 U. S. 262. Where, however, the proceeding is brought to compel a carrier to furnish a facility not included within its absolute duties, the question of expense is of more controlling importance. In determining the reasonableness of such an order the court must consider all the facts—the places and persons interested, the volume of business to be affected, the saving in time and expense to the shipper, as against the cost and loss to the carrier. On a consideration of such and similar facts the question of public necessity and the reasonableness of the order must be determined. This was done in Wisconsin R. R. v. Jacobson, in which for the first time, it was decided that a state commission might compel two competing interstate roads to connect their tracks.

[To be continued.]

Producer gas from wood is being investigated by the U. S. Forest Service. It has been estimated that 1,500,000 cords of wood waste is consumed annually as refuse in the Pacific Northwest. This would be sufficient to yield 195,000,000,000 cubic feet of producer gas, and develop from it 1,125,000,000 kilowatt hours of electric energy. Thus far, the most extensive development of wood gas producers has been in France and Sweden. Plants are operated also in England, India and Mexico. In this country, there are a few producer plants operating in the South and Southwest. In the former region, producer gas is being generated from wood waste, composed of 50 per cent sawdust and 50 per cent sawmill hog. The cost for brake horsepower hour was found to be 22½ mills, half of which was for fuel and half for labor. Using coal in the same way, the cost was a fraction over 28 mills to the brake horsepower hour, 7½ mills being for labor. Through these various operations, it has been found that wood as compared with coal gives little ash and that is easily removable; it gives a higher grade of gas with much less tar, and the cost is lower for a uniform quality.

RATE REGULATION IN CALIFORNIA CITIES.

Following the enactment of the constitutional amendment giving the California Railroad Commission the authority to fix rates of public service corporations in cities, the question arises as to what effect this new condition will have upon several long-standing contentions between cities and water and light companies operating within their limits.

In the first place, it is pointed out that this section does not go into effect until the intention of the amendment is made operative by action of the state legislature. However, no doubt is entertained but that the legislature will take this action promptly.

Another fundamental feature in the new conditions will be that the Railroad Commission will not make new gas, electric, telephone and water rates periodically. The procedure has been to make new rates each year, going into effect on July 1st. The commission, it is stated, will follow its custom in the matter of railroad charges of inquiring into the justice of a rate only when it is questioned upon complaint, or when the situation seems to warrant its acting on its own initiative.

But with the public utility rates in 200 California cities coming under its jurisdiction at one time it is not considered probable that the commission will initiate any changes of its own motion at once.

In several cases the commission will enter upon contentions that have aroused bitter feelings, and it is intimated that among its first decisions may be some that will not be popular. In Los Angeles, for example, the elective officers of the people have been contending for some time for a cheap gas rate. Such contentions, it is intimated, have been carried on more in a political than a scientific atmosphere.

In several cases, as in the rates of the Spring Valley Water Company and the Pacific Gas & Electric Company in San Francisco, suits are in progress in the courts.

In connection with the amendment giving the commission the authority to make valuations of public utility properties for purposes of purchase by municipalities, the claim of the Railroad Commission is that it has had this power under the former laws. It has exercised it in the cases of Eureka, Fort Bragg and Glendale, where water plants have been purchased at the valuation made by the commission. In this procedure the city is free to quit the purchase plan, but the company may be forced to accept the commission's valuation in a court action in which the commission's figures are not questioned. It is understood that the commission stood ready to take this action in the Spring Valley matter, but that it was not requested to do so by the city administration.

Control Surrendered.

The following are incorporated cities and towns of California which already had surrendered to the Railroad Commission their control over some or all the public utilities within their boundaries:

Palo Alto, Willits, Orange, Sonoma, Monterey, Salinas, Eagle Rock, Antioch, Ontario, Belvedere, Daly City, San Jose, Huntington Beach, Taft, Petaluma, San Rafael, Oroville, Claremont, Oakland, Bakersfield, Napa, San Leandro, Mill Valley, Oakdale, Vallejo, Newport Beach, Kennett, San Anselmo, Sisson, Hemet, Santa Maria, Tracy, Sonora, Redondo Beach, Morgan Hill, San Mateo, Pacific Grove, Paso Robles, Hermosa Beach, Redlands, Inglewood, St. Helena, Los Gatos, Sausalito, Corona, Hollister, National City, Huntington Park, Hayward, South Pasadena, Dixon, Sunnyvale, Long Beach, Santa Monica, El Centro, Redding, Los Banos and Alhambra.

Approximately 200 incorporated cities and towns, including most of the largest municipalities in the State, have not surrendered the rate making power to the commission, but will be brought under its anthority when the necessary action is taken by the legislature at the coming session.

SURVEY OF CONNECTED LOAD.

The Utah Light & Traction Company is engaged in making a connected load survey of all of its residence, commercial and power customers in Salt Lake City. Fifteen men are engaged on the work and it is expected that it will be completed by January 1, 1915. Each customer is visited and all of his lights, appliances and motors are listed, the nature of the work done by a machine is recorded, so that this information taken in conjunction with the customer's consumption over a period of a year will furnish a large amount of valuable information.

A letter is mailed to the customer in advance of the visit of the canvasser stating the purpose of the visit and inviting the customer to make any suggestions that she may wish with reference to her service. In addition to securing first hand information in regard to the customer's installation and prospects for additional business, the company is obtaining by means of this canvass many suggestions which will enable them to avoid friction and mistakes in the future.

The canvasser carries a pad of inquiry slips and any questions from the customer in regard to irons, percolators, toasters, ranges, etc., are noted and are turned over to the New Business Department for follow-up. In this way many leads are being secured which will undoubtedly result in a considerable increase in revenue due to the addition of customers on appliances.

The most frequent questions are in regard to the possibilities of electric cooking. A large proportion of the women appear to be much interested in the subject and many have expressed a determination to install an electric range in the spring as a result of the demonstrations they have seen in the company's electric shop, at the State Fair, and elsewhere. The information obtained by the canvasser on the data cards is transcribed to a permanent customer's data card which will be used by the New Business Department in connection with new business campaigns which are contemplated in the future.

A Diesel-electric car, similar to the gas-electric car, is being successfully operated between Rastatt and Gernsack, in Saxon, Germany. The Diesel engine has a capacity of 147 kw. and operates at 450 r.p.m., with control apparatus reducing the speed to 200 r.p.m. The engine has six cylinders and operates on the four cycle principle. At a speed of 45 miles per hour the operation is quiet and the vibration not troublesome.

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The Metric System

The Oregon Society of Engineers has just undertaken the task of organizing an American association for the universal adoption of the metric system of weights and measures. Their efforts are worthy of support and should have the hearty endorsement of every progressive engineer. It is nearly fifty years since the metric system was legalized in the United States; everyone concedes its convenience and value; the public has been educated as to its methods, and yet we continue to conservatively cling to the older system in all the dealings of everyday life.

Many efforts have been made in the past to bring about a more general use of the metric system in America. The scientific men were the first to recognize the utility of this rational standard, the engineering societies usually employ a dual notation of weights and measures in their proceedings, and gradually the engineers are becoming accustomed to think in the metric system.

There is probably nothing, except a universal language and a universal monetary system, which is more vital to the international commerce the United States is now seeking, than an international system of weights and measures. This the metric system is destined to be, because of its superiority over any other system and because of the convenience of the decimal notation. It permits a standard of quantity which is as necessary as a standard of quality in getting and holding foreign trade. It promotes a better understanding between buyer and seller and thus helps to establish confidence.

The chief objection to the change has come from manufacturers who have employed the older system of dimensions in the design of their patterns and tools, which have been made with great accuracy and whose abandonment would represent a heavy expense. Yet these manufacturers have been among the first to advocate a standardization of sizes and are now working to that end. A standardization of units of measurement is a necessary preliminary to a standardization of machinery.

The efficiency of the metric system is far greater than the other. This refers not only to simplifying calculation, but also to eliminating the inconvenience, confusion and waste of time in converting from the one to the other. We see this not only in foreign exchange, but also in domestic commerce. How much more convenient would be the metric wire gauge of France than the half-dozen or more gauges now used for measuring wire in America. The electrical units of measurement have been based upon the metric system and are now employed universally, so that there is no confusion of meaning.

Germany did not legalize the metric system until two years after the United States took action, but by making its use obligatory the new measures were soon universally employed in all works and calculations. This has been a great factor in upbuilding German commerce and industry, especially in articles where precision of measurement and interchangeability of parts are essential.

The same arguments which apply to the adoption of a universal language are even more apt in urg-

ing the metric system of weights and measures. Weights and measures, like languages, are used subconsciously. A linguist does not feel that he has full command of a language until he is able to think in it. When a people intuitively think in centimeters and grams rather than inches and pounds, they will unconsciously adopt the former. It is the inertia of the subconscious mind which must first be overcome.

The result can be eventually attained by the gradual process of education, but it now seems opportune that there should be an executive order. Fable reports that plans were once made for a simultaneous shout from every individual on the earth in order to signal Mars. When the given moment arrived every one except a deaf old lady in Texas waited to hear how big a noise the others would make. Likewise with the metric system—everybody is waiting for everybody else to adopt it. If the postoffice issued an order that no newspapers or periodicals would be granted second-class privileges unless the metric system were employed in all articles, if copyright were contingent upon the same observance, or if Federal job-holders were under like obligations, the desired result would be accomplished very quickly.

What Constitutes a Public Utility

An interesting question has been brought to light by a provision in the charter of Bakersfield, California, which defines ice as a public utility. The high cost of ice has been responsible for the death of many infants who had been fed spoiled milk and public regulation of ice companies is believed to be the best way to solve the problem. While such public control is certainly a necessity, it is doubtful whether it can ever be accomplished on the legal contention that ice is a public utility. To serve ice to the public differs far more from public service than the mere placing of an another "e" in serv(e)ice.

A definition of a public utility, that is at once concise and complete, is difficult to formulate. If considered as "a private company which exercises its functions in a direction that is of vital importance to the members of the community reached by its activities," a broad interpretation will bring many callings within this classification. In such a sense coal is as much a public utility as is ice—for infants, milk, and for adults, food, should likewise be included. Where shall the line be drawn?

The public service commissions usually have jurisdiction over common carriers, pipe lines, gas, electric, water, telephone and telegraph companies, wharfingers and warehousemen, and define these callings as public utilities.

The one point which these several services possess in common is the necessity to first obtain a franchise over public property before they can do business. To do so it is necessary that they have the right of eminent domain. Furthermore governmental co-operation is essential to their successful operation. An ice or a coal company do not now come within these limitations.

Broadly speaking, there is little reason why this arbitrary division should always prevail. The socialistic tendency is to make every business more or less of a public utility. Civilization is essentially a process of converting luxuries into necessities. In a complex civilization ice is as much a necessity as transportation.

For the present, however, it is advisable to abide by the established limitations, especially as such control as is exercised by the pure food and drug act and the Sherman act offer adequate protection to the consumer. Many communities have recently forbidden an unwarranted increase in price because of war conditions, without attempting to define food-stuffs as public utilities, and the same sentiment should be effective in limiting the profits of the ice men.

As a matter of fact, within a comparatively few years, the delivery of ice will be almost as rare as the delivery of candles. Inventors and manufacturers are rapidly bringing the cost of an electric driven ice machine within the reach of every householder. With electric cold, electric heat and electric lights, the ice man, the coal man and the candle man will rapidly be eliminated from our economic civilization.

Neutralizing Inductive Interference

In connection with the problem of reducing the inductive effects of high tension power lines on telephone and telegraph circuits many expensive experiments have already been conducted. The results, to date, have been mostly of a negative character, as indicated by the recent order of the California Railroad Commission. While the troubles can be partially mitigated by sectionalization and transposition of lines, as well as prohibiting the use of apparatus otherwise desirable, no effective method has yet been devised for fully protecting communication circuits against high-frequency power surges.

What appears simple in theory is difficult to attain in practice. In chemistry, it is an easy matter to neutralize an acid condition by adding just enough alkali to form a salt, a suitable indicator like litmus showing the neutral point; in mechanics, an equilibrium can always be established between unbalanced forces; and even in electrical circuits, a neutralizing transformer can be designed to compensate for constant low frequency induction.

An interesting set of experiments have recently been completed in this direction along the line of the New Haven single-phase railroad under the direction of Chas. F. Scott. By paralleling the communication circuits with a primary wire subject to the same inductive influences, and connecting it to a transformer the electromotive force of whose secondary is equal and opposite to the induced primary, an opposing current is introduced in the communication circuit to balance the induction effect from the power line. While this scheme enabled telegraph operation in close proximity to the single-phase railway circuits, it did not eliminate the residual voltages due to the higher harmonics. In commercial practice the noise disturbances are still troublesome and the added resistance and capacity reduce the efficiency of communication.

Yet such experiments are only the forerunners of a line of investigation which should ultimately overcome the difficulties. The problem is essentially one for the engineer and not for the lawyer. It is believed that engineering ingenuity will finally devise a means whereby the telephone and power man can live in harmony, each with the other.

PERSONALS

William Burns, electrical contractor of Minneapolis, was a recent Seattle visitor.

K. G. Dunn, vice-president Hunt, Mirk & Company, of San Francisco is at Los Angeles.

A. B. Saurman, Pacific Coast manager Standard Underground Cable Company, is at Seattle.

F. N. Averill, manager of the Fobes Supply Company, has returned to Portland from Seattle.

E. G. Wilson, electrical contractor of Napa, Cal., was a recent business visitor at San Francisco.

Roy Demaree, manager Dinuba Electrical Works, of Dinuba, Cal., was in San Francisco last week.

M. F. Steel, salesman Benjamin Electric Manufacturing Company of San Francisco is at Los Angeles.

H. D. Brainerd of the Seattle branch of the Western Electric Company, has been transferred to the New York City office.

P. N. Longan, comptroller Mt. Whitney Power & Electric Company, of Visalia, was in San Francisco the latter part of the week.

R. M. Pike, president of the Yolo Water & Power Company, recently returned to San Francisco from a business trip to New York.

W. D. Thomas, representative Electric Railway & Manufacturers' Supply Company, is traveling throughout the southern part of California.

J. Paulding Edwards, consulting electrical engineer, specializing on electric railways, has opened offices in the Flatiron building, San Francisco.

E. M. Cutting, Pacific Coast manager Edison Storage Battery Supply Company, is making a business trip throughout the southern part of California.

J. Harry Pieper, engineer illumination and vehicles for Southern California Edison Company, has been elected president of the Los Angeles Ad. Club.

A. G. Wishon, general manager San Joaquin Light & Power Company, and **A. E. Wishon**, assistant general manager, are at San Francisco for the week.

J. B. Rowray, who resigned as general manager of the Northern Electric Company at Chico when a receiver was appointed, has succeeded **W. R. Lawson**, resigned, as superintendent of the road.

Ross Hartley, Portland manager of the Pacific States Electric Company, has been given charge of the Seattle office of that company. **F. N. Killam**, formerly manager at Seattle, is now with the San Francisco office.

H. T. Van Riper, traveling representative of the Pacific Electric Heating Company, of Ontario, Cal., is in Salt Lake City on his regular trip through the Inter-Mountain territory and will return to Los Angeles and the factory next week.

L. W. Shugg, advertising department of the General Electric Company of Schenectady, New York, recently arrived in San Francisco, where he expects to spend a few months in connection with the Panama-Pacific International Exposition.

W. D. Standrod of Pocatello has resigned as a member of the Idaho public utilities commission. For several months Judge Standrod has contemplated taking this action. He leaves the employ of the state for personal reasons, as he has other matters at hand to which he intends to devote his attention.

T. A. McDowell, manager, meter department of the Westinghouse Electric & Manufacturing Company of Pittsburg, Pa., with **M. C. Schinederberg**, manager of the switch board department, will be in San Francisco on the 23d, 24th, and 25th of this month. They are on their annual tour of inspection.

W. L. Goodwin, vice-president, Pacific States Electric Company, and **R. M. Alvord**, sales manager General Electric Company of San Francisco, have returned from a few days' business trip throughout the southern part of the State, during which they were attendants at the quarterly meeting of the California Electrical Contractors' Association at Los Angeles.

MEETING NOTICES.

San Francisco Section A. I. E. E.

The regular meeting of the San Francisco Section of the American Institute of Electrical Engineers will be held in the Engineers' Club, Hotel Sutter, at 8 p. m., November 20. A series of fifteen minutes papers devoted to a "Symposium on Sporadic Insulations" will be read by P. M. Downing, Harris J. Ryan, J. E. Woodbridge and J. P. Jollyman.

Seattle Section A. I. E. E.

The November meeting of the Seattle Section of the American Institute of Electrical Engineers was held on Tuesday evening, November 17th, in the Assembly room on the top floor of the Central Building. A short paper on "The Repulsion Motor," was read by W. M. Strickler, and a series of talks on "The 'Breaking In' Period of the Engineering Graduate," was given by C. E. Magnusson, A. A. Miller, J. D. Ross, M. T. Crawford, J. R. King, L. F. Curtis, and E. A. Loew.

Utah Electric Club.

At the regular luncheon of the Utah Electric Club at the Commercial Club, Salt Lake City, November 12th, Dr. Chas. D. Stewart of the Stewart X-Ray Laboratory gave a most interesting talk on the X-Ray and its application to madicine and surgery, accompanying his talk with lantern slide illustrations of a few of the many thousands of X-Ray photographs which he has made for physicians and surgeons in the Inter-Mountain territory in the last ten years. These photographs and Dr. Stewart's talk brought out most forcibly the valuable service which the X-Ray has rendered to the human kind by permitting the correct diagnosis of injuries and diseases and greatly simplifying the treatment of these cases.

Joint Meeting Portland A. I. E. E. and N. E. L. A. Section.

A rousing meeting of the Portland sections of the A. I. E. E. and the N. E. L. A. was held in the new Pacific Telephone Building in Portland, Oregon, on November 10th. The entire program was arranged by the telephone members of the sections. The paper on "The Telephone Plant With Relation to Fires" called forth a spirited discussion from Messrs. Friendly, Searing, Scott, Weber and Battalion, Chief Stevens of the Portland Fire Department.

After the technical section was adjourned the members were divided into small parties in charge of telephone men who escorted them through the building. The guides illustrated at various points, the practical working of the exchange by operating the apparatus for the benefit of the visitors. The next meeting has been postponed until December 15.

Oregon Society Engineers.

The November 9th Monday Luncheon of the Oregon Society of Engineers, was addressed by O. M. Plummer, secretary and treasurer of the Portland Union Stock Yards Company and member of the Portland school board, on "Our School situation." The chairman of the day was Mr. Walter H. Graves, land clearing engineer and president of the Oregon Society of Engineers. Mr. Plummer pointed out that Portland's new school houses had many new and novel features such as swimming pools in the basements and play grounds on the roofs; and also only class A buildings can be built for school purposes as the city ordinances will permit nothing else. He said that the school board desired the cooperation of the Oregon Society of Engineers so as to ob-

tain the best efficiency in handling the school affairs. He also pointed out that the ordinary citizen did not take enough interest in the school board affairs and there was no public board which could so easily spend public money without being criticised, as the school board. Nevertheless the board desired co-operation and advice.

The regular monthly meeting of the Oregon Society of Engineers was held in the Public Library Building, room A, November 12, 1914. J. C. Stevens made his report on the "Metric System of Measures." This caused an extended discussion, and finally it was decided to form a committee to organize an American Association for the universal adoption of the metric systems of measures, and all technical associations will be asked to aid in the movement. Also Miss M. Dixon, technical librarian for the Multnomah County Library Association, gave a short talk on co-operation between the library and the Oregon Society of Engineers.

Jovial Electrical League of Southern California.

The weekly luncheon of the league, held at Christopher's on November 11th, was attended by over 100 Jovians and friends, and was presided over by Ted. E. Burger as chairman of the day. Tribune Pieper, who was congratulated on his recent election as president of the Los Angeles Advertising Club, read a telegram of greeting from Jovians Francis and Van Kuran, who are on their way eastward. He also announced the appointment by Jupiter Niesz of A. E. Morphy as Chief Stentor for this district and the following assignments

Congressman 13th district, James G. Pomeroy, No. 820.

Statesman California and Arizona, James N. Colkitt, No. 2627.

First Tribune, Los Angeles, J. Harry Pieper, No. 11868.

Second Tribune, Los Angeles, H. F. Anderson, No. 10705.

The three-minute talks by members on the personal and business characteristics of three other Jovians, mentioned in our last issue, afforded much amusement, and will be repeated at succeeding meetings. An interesting correspondence, which "perhaps" passed between Messrs. Pieper and Burger, regarding the correctness of the word "electrical" or "electric," when used in connection with the word "league," was read by Mr. Burger and the wordy battle was declared a draw. The same will, no doubt, be continued until some authority will act as umpire and satisfy the contestants. After the rendition of a splendid musical program, the chairman introduced Frank G. Tyrrell, who delivered an eloquent and helpful address on "Business Ideals." He spoke of the power and mastery of business ideals and necessity and importance of ideals in our relationship with help, for good will among the men working for us frequently spells the success of an enterprise. He urged his hearers to remember that the manside of a job is freqnently more important than the product side.

LETTERS THAT WIN.

St. Louis, Mo., August 25, 1914.

Friend Jovian:

I want to give you a few FACTS, which I believe you have failed to realize, and as they may be somewhat unpleasant for you to absorb, I ask you to read the letter through before you get "peeved," and then see if you don't agree with me that the Order is more mistreated by having to write it than you are by having to read it.

This is the FOURTH notice, since last October, asking you to pay TWO DOLLARS, which represent your YEARLY DUES to the Jovian Order. Outside of the labor involved in filling out invoices, addressing envelopes, etc., and the pain of the brain-throbs we expended to try and concoct the previous notices so they would not hurt your feelings (because we realize a dun is an unpleasant sort of animal at best) it costs the Order a lot of perfectly good money that we could use for practical work for YOUR benefit and that of all our members.

JUST THINK A MOMENT! We try to be courteous, so, all these notices are sent under two-cent postage—that's EIGHT CENTS—4 PER CENT OF YOUR DUES! The other expense—and it is probably as much again—is,

Typist, invoices and envelopes.

Four envelopes—in which invoices and return addressed envelopes are enclosed.

Four return addressed envelopes—enclosed to save YOU the trouble of addressing ONE.

Four invoices with your potential typed on face.

Three printed notices—worded so that Chesterfield himself would have gloated over them.

This letter.

That's a lot of lost motion for the collection of TWO DOLLARS, now, honest, don't you agree with us?

Sincerely yours in Jovianism,

ELL C. BENNETT.

No. 3932-13, Twelfth Mercury.

P. S.—If you didn't receive other notices, sorry, but we've used the address you gave us.—B.

San Francisco, Cal., Oct. 26, 1914.

Dear Brother Mercury:

Your most interesting and unique letter, or in fact brutal dun (an unpleasant sort of an animal at the best) was absorbed, but I was not peeved, and being in Sin-crow-nis-him with your views, can offer no resistance to my Worthy Jovian Mercury Bennett, because he is a good conductor of electricity, so herewith enclose my No. 9310 Potential flow of 2½ amperes capacity direct current-cy to you, thus allowing a fair and liberal allowance for the overload on your service and the short circuit in my power station, and as you rotate this brief current literature with frequency with us both on neutral relations, it becomes apparent that your cycle of duns were more or less shunted.

I can't conceive how any good Jovian could re-fuse to pay his over due wattage, especially when he has such a good field to lag in, in fact if I oh-m any more current-cy allow me to transmit a vote of thanks to you for being in synchronism for my rotors enclosed. I hardly think an efficient Jovian you could put up a better torque with the right polarity could ever get by with such an inductance without being electrocuted. His specific gravity has to my knowledge never been paralleled and his power factor more than compensates me for the lag in my current-cy.

Well, I have shunted this letter with good lamentations and when you are through commutating my electrical hieroglyphics and it don't phase your carrying capacity, just sit right down like an efficient vulcan like we have out here and mail my primary receipt to the fields of dear old California, S. F. And in terminating my epistle allow me to state that if by chance you should ever get a short-circuit over the lines of the S. P. or Santa Fe R. R. to the above terminal, I would be pleased to rotate you and our live-wire bunch of high efficiency units out to see the world famous cliff house waves and saturate your accumulator with Exide solution from the plates and porcelain of this famous resort.

I am quite positive that your brief stay with us will not be in the negative and the impressions we will endeavor to leave on your lag will more than offset the expenditure on your expense account.

Trusting to have the pleasure of meeting you face to face and in appreciation of your high Power-Factor, I beg to remain, all to-gether-all the time—for everything electrical.

Yours and then some,

W. R. BAKER.

NEWS OF WASHINGTON PUBLIC SERVICE COMMISSION.

Members of the public service commission plan to attend the annual convention of railroad commissioners at Washington, D. C., this month. Chairman C. A. Reynolds will return via California.

Engineers of the public service commission are taking an inventory of the properties of the Key City Power & Light Company at Port Townsend preliminary to fixing a valuation on the plant.

The commission has ordered the Pacific Telephone & Telegraph Company to supply service to the Hazelwood district from the Spokane exchange.

The commission has denied and dismissed the petition of Morris, vs. Puget Sound Traction, Light & Power Company, that a car route be re-established on Broadway, between Jefferson and Jackson streets, Seattle.

The commission has set the following causes for hearing: December 8, Everett, Commission vs. Pac. N. W. Traction Co., Travis vs. Pac. N. W. Trac. Co., Brown vs. Pac. N. W. Trac. Co.; December 12, Everett, Commission vs. Everett Gas Co., Hendrie vs. Everett Gas Co.; December 15, Seattle, rules and regulations Tel. Co.; December 16, Seattle, Seattle vs. Seattle Light Co.; December 21, Port Townsend, Commission vs. Key City Light & Power Co.; December 4, Tacoma, Commission vs. Puget Sound Electric Railway; December 21, Tacoma, Oscar Klocker vs. Key City Light & Power Co.

NEWS OF CALIFORNIA RAILROAD COMMISSION.

The commission has rendered a decision denying the application of the Southern Pacific Company for a rehearing of the transbay commutation rate case. In this case the railroad company sought to raise all its commutation rates as between San Francisco on one side and Oakland, Berkeley, Alameda and other cities on the other side.

The commission has issued a supplemental order authorizing the Southern California Edison Company to sell $134,000 of its 5 per cent bonds at not less than 86 per cent of their face value.

The Marin County Electric Railways has filed an amended application with the Railroad Commission requesting authority to start construction work at Mill Valley on private funds, pending the sale of the stock and of the receipt of deferred payments on stock already subscribed. The commission in its previous decision authorized the railway company to start construction work when $35,000 received from the sale of stock had been deposited in Marin County banks.

The commission has rendered a decision authorizing the Southern California Edison Company to issue $784,000 face value of its 5 per cent bonds falling due November 1, 1930. Two hundred and sixty-six thousand dollars of these bonds may be issued at once, provided the company receives therefor not less than 86 per cent of their face value, plus accrued interest. The proceeds from the sale of this portion of the issue will be used by the company in paying promissory notes amounting to $250,000. The commission's order provides that the remaining $518,000 face value of the bonds shall not be issued until the commission has made a further order specifying the minimum price at which they shall be sold and the specific purposes to which the proceeds shall be applied.

The Long Beach Consolidated Gas Company has filed an application with the commission for a certificate of public convenience and necessity to operate a gas distributing system in certain portions of Orange County.

CIVIL SERVICE EXAMINATION HYDRO-ELECTRICAL ENGINEER.

The United States Civil Service Commission announces an examination for hydro-electrical engineer to fill a vacancy in the Quartermaster Corps of the Army, for service at Camp John Hay, Philippine Islands. The salary of this position is $2400 per year. It is desired to secure a man thoroughly familiar with the installation, construction and operation of hydro-electrical plants, including pipe lines, and with experience in testing, installing and operating them. The plant at Camp John Hay is to be operated by Pelton water wheels. Competitors will not be assembled for examination, but will be rated on general education and technical training (40 points), and practical experience and fitness (60 points). A general knowledge of the laws of electricity and magnetism, and a practical knowledge of the design, construction and testing of dynamos, motors and auxiliary electrical apparatus, hydraulic turbines, impulse wheels and mechanical auxiliaries of a hydro-electric power plant, is a prerequisite for consideration for this position. Applicants must have had at least six years' practical experience, of which two must have been in the constructing and installing of electric and hydro-electric machinery, and four years' experience in mechanical and electrical engineering. Of these four years, two must have been in the practical operation of a hydro-electric power plant. Graduation from a technical school of recognized standing will be accepted as equivalent to one year of the above required practical experience. Statements as to training, experience and fitness will be accepted subject to verification. Applicants must have reached their twenty-fifth, but not their forty-fifth birthday on the date of examination.

TRADE NOTES.

American Circular Loom Company announce the removal of its main office to 90 West street, New York City.

J. J. Agutter & Company have been awarded the contract for the wiring in the Y. M. C. A. Building at Bellingham.

The Home Electric Company of Portland has been awarded the contract for $10,000 worth of incandescent lamps for the city.

R. J. Holterman, formerly with Holabird-Reynolds Co., has opened a new electric shop at 535 Market street, San Francisco.

The Alaska Electric Light & Power Company of Juneau, Alaska, will operate with fuel oil in the future. They have just completed a tank with a capacity of 15,000 gallons.

The Allis-Chalmers Company has been awarded the contract for building the new substation at Smith Cove by the Seattle Port Commission. The contract price was $5760.

The contract for the First Avenue curb lighting system in Spokane has been awarded to the William E. Chase Engineering Company, for $66,429. Posts are to be pressed steel bodies.

Apfel & Jansen, electrical contractors of Seattle, have secured the contract for the installation of the Apfel system of electric heating in the general offices of the Great Western Stove Company, Seattle.

The contract has been authorized for the direct pumping units for the Sunnyside unit of the Yakima irrigation project, Sunnyside, Wash., to the Pelton Water Wheel Company of San Francisco, for $7954.

E. C. Leighton, electrical engineer of Seattle, has been awarded the contract for the wiring and lighting of the Hanford street warehouse by the Seattle Port Commission. The contract price was $4035.

The United States Navy has placed orders for six engines for submarines with the Busch-Diesel Engine Company of St. Louis. Each engine will be of 800 h.p. and two engines promised to have the engines ready within a year.
each are intended for submarine L-5, L-6 and L-7, now being built at Bridgeport, Conn. The Busch-Diesel Company has

Ralph B. Clapp, manufacturers' agent, San Fernando Building, Los Angeles, has recently arranged to represent the Electrical Engineers' Equipment Company, Electric Magnetic Tool Company, and the Pittsburgh Transformer Company in

California, Arizona and Nevada, in addition to those he has been handling in Southern California—Harvey, Hubbell, Inc., American Circular Loom Company, and Stanley & Patterson.

M. C. Baker & Son have recently opened an electric shop at 636 Market street, San Francisco. In addition to contracting and sales work, special facilities have been installed for repairing and testing electric meters and instruments, as well as caring for laboratory work. I. H. McCarthy, an electrical engineer of wide experience in industrial application has recently joined forces with Mr. Baker and the firm is prepared to handle anything electrical.

A new sign receptacle is being marketed by the Bryant Electric Company of Bridgeport, Conn. This receptacle goes into a 1⅜ in. hole and requires no lug or slot to prevent it from turning. It is prevented from turning by three fins on the front portion of the porcelain, which bite into the metal of the sign as the two portions of the receptacle are brought together with the center screw. The center screw does not come into direct contact with the center contact of the lamp and therefore there is no tendency for the screw to loosen by friction of the lamp on the screw-head. The entire front portion of the receptacle can be removed and replaced without disturbing the line connections. Since the receptacle goes into a perfectly smooth hole, it can be set in any desired position and then be positively prevented from turning by tightening the center screw.

Eureka, California, celebrated the driving of the golden spike of its first railroad October 23d. This railroad—the Northwestern Pacific—was financed jointly by the Southern Pacific and the Santa Fe Railways. It connects San Francisco with Eureka, a distance of 291 miles, by means of a line running between the Coast Range mountains and the ocean. Eureka, and tributary territory, rich in timber and wonderfully fertile soil, has heretofore depended solely on sea transportation. The opening of the new railroad is the most vital and important event which could happen to the city and territory. The electric light and power requirements of Eureka and surrounding towns and villages and the gas requirements of Eureka are served by the Eureka Division of the Western States Gas & Electric Company, which the growth and proseprity of the community will very favorably affect.

Plans and specifications have been completed by Hurlburt & Rands, engineers, Henry Building, Portland, and bids are now being received by the South Fork Water Commission at Oregon City until 2 p. m., November 21, for the construction of the water supply system between Oregon City and Clackamas. The work is to consist of about 25 miles of pipe and the construction of a large reservoir to have a capacity of 5,000,000 gallons. Alternate bids will be received for wood and steel pipe. In wood pipe construction there will be 13 miles of machine banded wood stave pipe of the 18 in. size and 12 miles of 16 in.. The steel pipe will be either lap welded or riveted. The bids for the reservoir will also be for alternate figures, for a concrete lined and open reservoir and reinforced concrete construction. Including this, there will be 43 tons of cast iron pipe and fittings for the reservoir equipment and a pumping house.

The commercial department of the Utah Light & Traction Co. has just entered into a contract with Mr. Brigham Whitmore, builder of the Whitmore Apartments, for the sale to him of 26 Four "K" Simplex Electric Ranges to equip the twenty-six apartment building which he is just completing at the corner of First South and Second West street, Salt Lake City. This will be the first apartment house in Salt Lake City to be completely equipped with electric ranges. It required considerable work on the part of the company's representative to convince Mr. Whitmore that the equipment of his apartment houses with electric ranges would serve as an inducement for people to occupy them, especially in view of the fact that they are located on the west side of the city where he must depend upon working men with moderate salaries for his tenants. Several of them had already engaged apartments in the building, and one of the company's representatives went with the owner to interview these tenants and without exception they all stated that they would prefer to use electric ranges even though the cost were somewhat higher and that this would be quite an inducement for them to engage apartments. These visits quickly decided the owner to install electric ranges and indicated that the educational work which the company has been doing for the past several years on the subject of cooking with electricity has begun to bear fruit.

PACIFIC COAST GAS ASSOCIATION.

About seventy-five members of the Pacific Coast Gas Association met at dinner in the Engineers' Club, San Francisco, on the evening of November 17th. E. C. Jones, president of the Association and of the American Gas Institute, outlined the plans which have been perfected for holding a collective exhibit of gas apparatus and appliance at the Panama-Pacific Exposition, reading many letters and telegrams which assure the success of the plan. D. E. Keppelman told of the valiant work which was done at the recent meeting of the American Gas Institute to make this exhibit possible. John A. Britton, who presided at the meeting, appointed John G. Redd superintendent of the exhibits, and named the following committee to look after their receipt and care: Frank A. Cressy Jr. of Modesto, chairman; F. A. Leach, C. B. Babcock, R. S. Thompson, D. E. Keppelman, F. C. Millard, Paul Hough, H. P. Pitts, H. R. Basford and R. S. Pederson.

This meeting was also made the occasion for presenting the medals which were awarded to the writers of the best papers presented at the Long Beach meeting of the Association in September, R. S. Thompson, H. R. Basford, B. F. Pederson, C. B. Babcock and H. P. Pitts.

BOOKS RECEIVED.

American Handbook for Electrical Engineers, compiled by a staff of specialists, Harold Pender, editor-in-chief; 2023 pp.; 4x7 in.; thin paper; leather bound. Published by John Wiley & Sons; for sale by Technical Book Shop, Crossley Bldg., San Francisco. Price $5.00.

The eternal "why" is the first greeting for a new handbook. Aside from the fact that engineering in general, and electrical engineering in particular, is progressing so rapidly that new books must appear with a frequency which taxes the pocket book this work represents a number of innovations which make it welcome and greatly enhances its value.

The most noticeable feature is its encyclopedic make-up, a series of complete articles alphabetically arranged. This facilitates ready reference which is further augmented by the very complete index. In addition a topical list of articles has been prepared in lieu of the usual talk of contents.

This list comprises twenty-four main headings, each with from five to forty sub-headings. The main headings include such widely diversified topics as engineering materials, principles of electricity and magnetism, instruments and apparatus, transmission and distribution, industrial application of electricity, steam engineering and hydraulic engineering. The sections on calculating alternating current phenomena are especially complete, clear and concise.

Because of this diversity the book is equally good for electrical engineers interested in the principles of other branches of engineering or for other engineers interested in the application of electricity to their problems.

The treatment is essentially from the standpoint of the practical man, with fine-type development of the theory behind the principles for those interested.

With much to praise and little to criticize this volume is really indispensable to the kit of every progressive engineer,

NEWS NOTES

FINANCIAL.

SEATTLE, WASH.—Bids will be received until November 28 for the purchase of $404,000 light extension bonds of the city. Issued in $100 denominations.

NOME, A. T.—A. J. McConnell, general manager of Seward Peninsula Power Company is on the way east to interest financiers in plans for the improvement and enlargement of the local utility plant.

SAN FRANCISCO, CAL.—A 5 per cent $100 bond of the Municipal Street Railways has been prepared by John E. McDougald, city treasurer. Twenty-five thousand of these bonds are ready for issuance and will be placed on sale at the treasurer's office December 1.

SEATTLE, WASH.—When City Comptroller Carroll hears from Caldwell, Masslich & Reed, bond buyers of New York, as to the legality of the steps taken by the city to sell the $404,000 light extension bond issue over the counter in $100 blocks, advertisements of the sale will be prepared.

SEATTLE, WASH.—The receivers of the Seattle, Renton & Southern Street Railway have offered to sell to the city of Seattle that portion of the railway within the city limits for $200,000 in municipal railway bonds at 4½ per cent interest and 20 per cent of the gross earnings of the property for 28 years, the city in no case to pay more than $1,300,000 for the property in excess of the $200,000 in bonds, which represents the first payment.

INCORPORATIONS.

SAN DIEGO, CAL.—The Pauma Valley Water Company has filed articles of incorporation in the office of the county clerk. The capital is $300,000 and the incorporators are Monta J. Moore, J. C. Adams and G. M. Henderson. The purpose is to irrigate 12,000 acres of land in Pauma rancho.

POCATELLO, IDAHO.—The Grande Canyon Canal & Power Company has been organized with a capital stock of $200,000. The company is incorporated to enter into a general hydroelectric power business, to build electric transmission lines, irrigation canals, to operate electric plants of all kinds, to develope oil wells, and timber holdings. Dr. Sidney W. Badcon is president.

PHOENIX, ARIZ.—Articles of incorporation of the Machinery & Electrical Company have been filed with the county recorder. The company, which is formed to carry on the business of installing all machinery for electrical, gas and steam heating, ventilating and lighting plants has a capital stock of $50,000, to be divided into 500 shares, each of the par value of $100. The list of incorporators bears the names of E. A. Trincano, C. E. Scrivner, F. E. Rich and Reese M. Ling, all of Phoenix.

ILLUMINATION.

STOCKTON, CAL.—Included in the lighting plans for 1915 are electroliers for the business district.

FELLOWS, CAL.—If plans are carried out Lost Hill will have a natural gas system. Joseph Loeb is organizing a gas company.

LOS ANGELES, CAL.—Plans for supplying natural gas to all the houses in the San Fernando Fruit Farms subdivision are under consideration.

NORTH YAKIMA, WASH.—The city commissioners have passed a resolution calling a special election for December to vote on Yakima Heating Company electric franchise.

WATSONVILLE, CAL.—The contract has been awarded for installing an electrolier lighting system in East Third from Main to Alexander to the T. Electric Company.

PORTLAND, ORE.—A contract for remodeling lighting in Columbia Park and the construction of a lighting system in Peninsula Park has been awarded to M. J. Walsh & Co., for $2,238.

LOS ANGELES, CAL.—The park commission will consider new plans for the proposed ornamental lighting of Exposition Park. The original plans cannot be carried out because of lack of funds.

SPOKANE, WASH.—Petitions will be filed with the city council for the lighting of Sprague avenue from Division to Cedar street and Trent avenue from Division to Lincoln with artistic electroliers. The estimated cost is $110,000.

HERMOSA BEACH, CAL.—An effort is being made by residents on Pier avenue in the Camino Real district, to establish an ornamental lighting system from the city limits of Hermosa Beach to the city limits of Manhattan Beach.

SANTA BARBARA, CAL.—Sealed bids will be received by the board of supervisors of Santa Barbara county up to December 7th, for a 50 year franchise to operate a system of gas pipes and other appliances for distribution of gas along public highways in portions of the county.

NEWPORT, CAL.—The board of trustees has accepted the bid of F. O. Engstrum Company to install 139 standard street lights, using the new American Cement Products Company's marbleite posts. They were the only bidders, contract being let at $14,968, with extra cost of $20 each for marbleite posts.

ASHLAND, ORE.—At a recent council meeting the question was brought up of bonds for an auxiliary electric light plant, including a new building and equipment about a mile down the canyon from the present plant and a reservoir on the top of Crowson hill. The plans call for the bonding of the city for $32,000 for the light plans and $10,000 for waterworks improvements.

OAKLAND, CAL.—The city council received bids for furnishing and installing special lighting fixtures for the main rotunda of the city hall, council chamber and mayor's offices, as follows. H. S. Tittle, $24,700; Thomas Day Co., $27,560; Tiffany Studios, $31,700; Maxwell Hardware Co., $35,999; the English Co., $39,262. The bids were referred to the City Attorney and Commissioner of Public Works.

TACOMA, WASH.—At a meeting of the council recommendations were made for extensive lighting plans for immediate placing in various parts of the city. Include territory from Cliff avenue to Yakima avenue between N 3d and N 6th streets and streets between and the alley crossings. Ornamental lights are to be placed on South D street from South Seventh street to South Twenty-first and on Jefferson avenue from Pacific avenue to South Twenty-first street and on South Seventeenth street from Pacific to D street. Steel poles are recommended.

TRANSMISSION.

SAN FRANCISCO, CAL.—The department of electricity has called for 50 standards for fire alarm boxes, which will be placed down town. They will be connected with the auxiliary alarm system as well as the central alarm station.

LEWISTON, IDAHO.—Engineer J. W. Morris of Portland, Ore., has filed a report on the dam across Clearwater, for hydroelectric development. Mr. Morris estimates that a plant to develop 2350 kw. would cost $488,102 and for the development of 3412 kw. $508,863.

PASCO, WASH.—Captain Gray will undertake to prevail on the Weyerhaeuser interests to construct a dam and power plant at Five Mile Rapids on the Snake River, a site which has great power possibilities. It is estimated that from 60

to 100,000 horsepower can be developed by damming the river at that point.

SAN FRANCISCO, CAL.—The works board has awarded to T. E. Davis & Son for $13,269 the contract for constructing a shop building for the department of electricity on the city's lot on Golden Gate avenue, between Leavenworth and Hyde streets. It is expected that this building will be ready next January. The department's present quarters in the Civic Center will then be torn down. The new alarm station in Jefferson square is now being equipped.

SALEM, ORE.—Because of error committed by Circuit Judge McGinn in instructing the jury, the Supreme Court, in an opinion written by Justice Eakin, has reversed him in the case of Willis D. Hoag vs. the Washington-Oregon Corporation. The plaintiff alleged that through the negligence of the company, a current of electricity was turned on while he was engaged in repairing its lines, and he was badly burned and disfigured. He brought the suit, the jury gave him a judgment for $30,000 and the company appealed. "This judgment must be reversed upon the authority of the Schulte case and remanded for a new trial," said the court. "The statute provides that an employer having charge of any work involving risk or danger to employes shall use every precaution practicable for the safety of life and limb, and the manager and superintendent in charge of the work shall be held to be the agent of the employer. The court instructed the jury as to the common law liability of the defendant company, and went into detail as to three elements of the common law liability, namely, the fellow servant rule, the assumed risk and contributory negligence; but these elements are a defense in a common law action and are affected by the statute of 1910. The first two elements are entirely eliminated by the statute, and one is modified, but the instruction of the court wholly failed to enlighten the jury as to what facts would take the case out of that state, and the jury was left entirely in the dark on that question. The case was clearly a case of an owner doing the work of repairing or altering a structure, involving danger, and came under the statute, and whether proper care and precaution were used, or contributory negligence was established as an element to affect the amount of damages, should have been presented to the jury."

TRANSPORTATION.

SAN FRANCISCO, CAL.—The completion of the Municipal Railway line along Chestnut street skirting the entire front of the Exposition grounds, marks the beginning of passenger traffic from the Ferry along Van Ness avenue directly to the Fillmore and Scott street entrances.

SAN FRANCISCO, CAL.—At a recent meeting of the Mission Promotion Association, President Eustace Cullinan reported that eight improvement clubs had joined the Mission Association in protesting against the construction of a cable road on Church street. These organizations have requested the supervisors to rescind its action instructing the city engineer to prepare plans for the construction of such a system.

TELEPHONE AND TELEGRAPH.

LOS ANGELES, CAL.—The application of the San Pedro Home Telephone Company for a telephone franchise at Wilmington, has been referred to the city attorney for a report thereon.

SAN FRANCISCO, CAL.—The board of supervisors unanimously adopted the compromise suggested by the public utilities committee in the matter of the Home Telephone Company's franchise. Under the proposed agreement the Pacific States Company will be allowed to purchase the Home Telephone Company's franchise and on its part will pay the city 2 per cent of its gross revenues, which will amount to about $72,000 per year at the present rate of business.

WILLOWS, CAL.—A. H. Quatman, local resident, has secured an option of sixty-six and two-thirds per cent of the Glenn County Telephone Company's stock. He intends to sell the stock of the immediate future. Quatman refuses to reveal the name of the proposed purchaser, but says he is an "independent operator." It is believed here that the ultimate owner of the company after the transfer of stock will be the Pacific Telephone & Telegraph Company. Quatman's options call for the payment of between 50 and 60 cents on the dollar for the stock, the number of shares determining the price paid.

SALEM, ORE.—Permission to increase its rates so its net revenues may be between 7 and 8 per cent has been granted the Interurban Telephone Company of Silverton, by the State Railroad Commission. The commission found the actual value of the plant to be $17,702, and reproduction cost to be $25,231. Its operating expenses for 1913 were $4,938.78 and its net revenue $2,561.63. New rates authorized by the commission are as follows: Business telephones, one-party, monthly, $2.25; two-party, $2; four-party, $1.75. Residence telephones: One-party, $1.75; two-party, $1.50 and four-party, $1.25. The rate for farmer-party lines is $5 a year.

ASTORIA, ORE.—The Marconi Wireless Telegraph Company has started preliminary work on the erection of a new wireless station on the south side of Young's Bay near Astoria. The new plant is to be the most powerful on the coast north of Bolinas Bay and is to have a 25 kw. equipment capable of sending a distance of 3500 miles at night. Four self-supporting steel towers are to be erected, each 10 ft. by 10 ft. in plan at the base and 300 ft. high. The towers will be placed at the corners of a 300 ft. by 600 ft. rectangle, which is to be the size of the aerial. The completed station is to cost from $70,000 to $80,000 and will have a working force of four men, a chief and three operators.

WATERWORKS.

EVERETT, WASH.—The city commission has decided to select an engineer and award a contract for the municipal water project.

SAN FRANCISCO, CAL.—It has been practically decided that the Spring Valley water bond election will not be held until next March.

RED BLUFF, CAL.—An election in the matter of bonding Red Bluff in the sum of $85,000 for establishing a municipal water system to be held December 10th.

SPOKANE, WASH.—Steel water mains will be laid at the expense of the city water improvement fund in Kiernan avenue. This was decided by City Commissioner Fassett.

CLYDE PARK, MONT.—The low bid for the installation of waterworks system for which bonds in the amount of $18,000 were recently voted was submitted by C. H. Green Company, Spokane.

AMITY, ORE.—The city council is taking steps toward putting the matter of voting bonds for waterworks before the people. Not over $15,000 bonds would be required and in all probability only $12,000 would be needed.

WARRENTON, ORE.—At a special election held here bonds in the sum of $150,000 were voted for the purpose of constructing a water system. The pipe line will extend from the Lewis & Clark River a distance of 16 miles.

ST. IGNATIUS, MONT.—Bids will be receipted until December 15 by the U. S. Reclamation Service for the construction of 38 miles of canals and laterals involving excavation of about 106,000 square yards of material.

LOS ANGELES, CAL.—The Malabar District Improvement Association has requested that action be taken to install a more efficient water system in the district bounded by Ganahl, Wabash, Indiana and Brooklyn avenue. The request was referred to the public service committee with favorable recommendation from the council.

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A-1 American Ever-Ready Works of National Carbon Co....
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B-1 Baruch Electric Controller Corporation..... 3
51 Grant Avenue, San Francisco; 424 13th St., Oakland.

B-2 Benjamin Electric Manufacturing Co.....
Rialto Bldg., San Francisco.

B-3 Blake Signal and Manufacturing Co.....
680 Howard Street, San Francisco.

B-5 Bridgeport Brass Co..... 3
(See Pierson, Roeding & Co.)

B-6 Berkeley Electric Cooker Co.....
1932 Center Street, Berkeley.

B 7 Busch-Sulzer Bros.-Diesel Engine Co..... 3
Rialto Bldg., San Francisco.

C-1 Century Electric Co..... 3
614 South Grand Avenue, Los Angeles; 56 Natoma Street, San Francisco; Seattle; Spokane.

C-2 Colonial Lamp Works.....
444 Market Street, San Francisco.

C-3 Crocker-Wheeler Co.....
Title Insurance Bldg., Los Angeles; Salt Lake City; First National Bank Bldg., San Francisco; Seattle.

C-5 Crouse, Hinds & Co.....
Chicago, Ill.

C-4 Cutler-Hammer Manufacturing Co.....
579 Howard Street, San Francisco; Morgan Bldg., Portland, Ore.; San Fernando Bldg., Los Angeles.

D-1 D. & W. Fuse Co.....
Western Electric Co.

D-2 Dearborn Drug and Chemical Works.....11
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E-1 Edison Lamp Works of General Electric Co.....
Rialto Bldg., San Francisco.

E-2 Edison Storage Battery Supply Co.....11
441 Golden Gate Avenue, San Francisco.

E-3 Electric Agencies Co.....
247 Minna Street, San Francisco; Gentral Building, Los Angeles.

E-4 Electric Storage Battery Co.....
Pacific Electric Bldg., Los Angeles; Spalding Bldg., Portland; 118 New Montgomery Street, San Francisco; Colman Bldg., Seattle.

F-1 Fairbanks, Morse & Co.....
Los Angeles; Portland; 651 Mission Street, San Francisco; Seattle; Spokane.

F-2 Fort Wayne Electric Works of G. E. Co.....
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G-1 General Electric Co..... 12
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H-5 Hunt, Mirk & Co.....
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K-1 Kellogg Switchboard and Supply Co.....
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M-4 Morse Chain Co.....
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M-3 Moore & Co., Charles C.....
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W-1 Wagner Electric Manufacturing Co.....14
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W-2 Western Electric Co.....
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W-5 Westinghouse Machine Co.....
141 Second Street, San Francisco.

W-6 Westinghouse Lamp Co.....
(See Westinghouse Electric and Manufacturing Co.)

W-7 Weston Electrical Instrument Co.....11
682 Mission Street, San Francisco.

W-8 Western Pipe & Steel Co.....
444 Market Street, San Francisco; 1758 North Broadway, Los Angeles.